CLAIMS

We claim:

1. A flexible solar cell assembly for use in an outer space environment or a non-Earth environment, comprising:

a solar cell having a first side and a second side, said solar cell configured to produce an electrical current when receiving photons on at least said first side; and,

a flexible substrate operably coupled to the second side of said solar cell.

2. The flexible solar cell assembly of claim 1, wherein said substrate comprises a polymeric substrate.

3. The flexible solar cell assembly of claim 2, wherein said polymeric substrate comprises a polyimide.

4. The flexible solar cell assembly of claim 1, wherein said substrate comprises a flexible thermally non-conductive material.

5. The flexible solar cell assembly of claim 1, wherein said solar cell includes a thermally conductive layer, said thermally conductive layer communicating with a black body radiating layer extending through a portion of said substrate.

6. The flexible solar cell assembly of claim 1, wherein said solar cell has a first periphery having a first dimension, said substrate having an aperture extending therethrough having a second periphery with a second dimension, said first dimension being greater than said second dimension.

7. The flexible solar cell assembly of claim 6, wherein a black body radiating layer is disposed in said aperture and is thermally coupled to said solar cell.

8. The flexible solar cell assembly of claim 1, wherein said solar cell includes a thermally conductive layer, wherein at least a portion of said thermally conductive layer extends through an aperture in said substrate.

9. The flexible solar cell assembly of claim 1, wherein said solar cell and said substrate are configured to maintain a predetermined shape after being bent to said predetermined shape.

10. A flexible solar cell assembly for use in an outer space environment or a non-Earth environment, comprising:

a plurality of solar cells each having a first side and a second side, each of said plurality of solar cells configured to produce an electrical current when receiving photons on at least said first side; and,

a flexible substrate operably coupled to the second side of each of said plurality of solar cells.

11. The flexible solar cell assembly of claim 10, wherein said substrate comprises a polymeric substrate.

12. The flexible solar cell assembly of claim 11, wherein said polymeric substrate comprises a polyimide.

13. The flexible solar cell assembly of claim 10, wherein said flexible substrate comprises a flexible thermally non-conductive material.

14. The flexible solar cell assembly of claim 10 wherein each of said plurality of solar cells includes a thermally conductive layer communicating with a black body radiating layer, respectively, each of said black body radiating layers extending through said substrate.

15. The flexible solar cell assembly of claim 10, wherein each of said plurality of solar cells has a first periphery having a first dimension, and said substrate includes a plurality of apertures each having a second periphery with a second dimension, said first dimension being greater than said second dimension.

16. The flexible solar cell assembly of claim 10, wherein each of said plurality of solar cells includes a thermally conductive layer, wherein at least a portion of each thermally conductive layer extends into one of a plurality of apertures in said substrate, respectively.

17. The flexible solar cell assembly of claim 10, wherein each of said plurality of solar cells comprise:

a photovoltaic conversion layer configured to produce an electrical current when receiving photons; and,

a first electrical contact layer electrically coupled to a first side of said photovoltaic conversion layer and a second electrical contact layer electrically coupled to a second side of said photovoltaic conversion layer.

18. The flexible solar cell assembly of claim 10, wherein said plurality of solar cells and said substrate are configured to maintain a predetermined shape after being bent to said predetermined shape.